

Interim quarterly report – Quarter 1, Year 1

Feed the Future Innovation Lab for Small-Scale Irrigation

Cooperative Agreement
No. AID-OAA-A-13-00055

February 7, 2014



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1. Introduction

The Feed the Future Innovation Lab on Small-Scale Irrigation (FTF-ILSSI) is a cooperative agreement funded by USAID under the Feed the Future program to undertake research aimed to increase food production, improve nutrition, accelerate economic development and contribute to the protection of the environment. The project seeks these objectives through identifying, testing and demonstrating technological options in small-scale irrigation and irrigated fodder, supported by a continual dialogue approach with stakeholders and capacity development toward sustained use of research approaches and evidence.

As the lead institution, Borlaug Institute for International Agricultural/Texas A&M University System is responsible for leadership, management and administration of the overall cooperative agreement. Together under sub-agreement with BI/TAMUS, several partners will conduct research and carry out the goals and objectives set forth. Partners in the FTF-ILSSI cooperative agreement include the International Water Management Institute (IWMI), the International Food Policy Research Institute (IFPRI), the International Livestock Research Institute (ILRI), North Carolina A&T State University (NCAT) and Texas A&M AgriLife Research (TAMUS). This document outlines the activities completed during Quarter 1 of Year 1 under the cooperative agreement for research under the Innovation Lab for Small-Scale Irrigation (FTF-ILSSI) as of January 2014.

Livestock is an important livelihood option for smallholder farmers in Ethiopia. With increasing trends in demand for livestock products, both globally and locally, the importance of livestock for income generation will increase. Currently exploitation of these opportunities is highly constrained by shortage of feed resources. Continuity of feed supply in Ethiopia is constrained by the seasonality of rainfall, a constraint that could potentially be overcome through small-scale irrigation. Options for use of small scale irrigation to enhance production of high value commodities including livestock products are being explored through the Innovation Lab on Small-Scale Irrigation.

2. Target Activities

Project Goal: To increase food production, improve nutrition, protect the environment and accelerate economic development through improved access to small-scale irrigation technologies					
Objectives, Activities and sub-activities	Completion Dates	Measurement Method	Target	Responsible Institution	Geography
Component 0: Plan, coordinate, and organize multi-institutional activities					
Activity 0.1. Initiate project activities (kick-off meeting with partners, external advisory committee, web site, initial reports, and agreements with national cooperators).	Sep-2018	Meetings held, plans and reports submitted, committee appointed.	Project initiated and plans and reports submitted on time	TAMUS	ET, GH, TA, USA
Activity 0.1.1. Develop a general (overarching) plan for studies: Annual Work Plan and Performance Management Plan.	Dec-2013	Annual Work Plan and Performance Management Plan	One Annual Work Plan and one Performance Management Plan submitted	TAMUS	ET, USA
Activity 0.1.2. Combined partner and stakeholder meetings in Ethiopia.	Jan-2014	Meetings held	Two meetings held	TAMUS	ET
Activity 0.1.3. Establish external advisory committee.	Feb-2014	Advisory committee appointed	One committee appointed	TAMUS	ET, TA, GH
Activity 0.1.4. Develop data acquisition and consolidation plan to overcome shortfalls in relevant data needed by IDSS.	Sep-2014	Data acquisition and consolidation plans	One data acquisition and consolidation plan developed	TAMUS	ET, USA
Activity 0.1.6. Develop project web site.	Feb-2014	Project web site	One project web site	TAMUS	USA

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Activity 0.2. Submit semi-annual, annual, mid-term, and final reports to USAID	Sep-2018	semi-annual, annual, mid-term, and final reports	All reports submitted on time	TAMUS	USA
Activity 0.2.1. Submit semi-annual reports.	Apr-2014	Number of semi-annual reports	Ten semi-annual reports	TAMUS	USA
Activity 0.2.2. Submit annual reports.	Aug-2014	Number of annual reports	Five annual reports	TAMUS	USA
Component 1: Identify promising, context appropriate small scale irrigation interventions, management, and practices for poverty reduction and Improved nutrition outcomes.					
Activity 1.1. Identify candidate small-scale irrigation interventions and conduct preliminary evaluations with IDSS.	Sep-2015	Interventions selected and evaluated with IDSS	10 interventions selected and 3 evaluated with IDSS	IFPRI, IWMI, ILRI, TAMUS	ET, GH, TA, USA
Activity 1.1.1. Review candidate interventions from previous and on-going projects for use of SSI in food and forage production: desk review, expert consultation.	Feb-2014	Report for each country: 3 interventions, management, and practices per country.	3 per country (IWMI); 3 per country (ILRI)	IWMI, ILRI	ET
Activity 1.3. Characterize potential small-scale irrigation sites, evaluate alternatives, select pilot sites for preliminary assessments.	Jun-2015	Develop maps of potential areas, draft targeting and monitoring framework, identify sites	3 maps and reports, 9 sites, 1 targeting and monitoring framework	IWMI and ILRI	ET, GH, TA
Activity 1.3.1. Characterization of sites; site specific interventions planning and analysis.	Feb-2014	Maps and accompanying report on potential areas for 3 countries	3 maps and reports	IWMI and ILRI	ET
Activity 1.3.2. Develop targeting and monitoring framework for assessing likelihood of success of intensive irrigated vegetable and forage production in specific locations: availability of land, labor, irrigation source, market for products.	Feb-2014	Draft targeting and monitoring framework developed	Tool ready for application	ILRI and IWMI	ET
Component 2: Evaluating impacts, trade-offs, and synergies of small-scale Irrigation technologies and practices.					
Activity 2.1. Identify opportunities and constraints related to data availability and quality needed for modeling small-scale irrigation systems.	Mar-2017	Data on constraints and opportunities, report on gaps	1 data set, one gap report	IWMI, ILRI	ET, GH, TA
Activity 2.1.1. Collation of data (previous and current project).	Jan-2014	Sets of existing data	Overview of existing data	IWMI, ILRI	ET, GH, TA
Activity 2.1.2. Identify gaps for each intervention.	Jan-2014	Gap report to TAMU	1 gap report	IWMI, ILRI	ET, GH, TA
Component 4: Capacity Development and Stakeholder Engagement and Dialogue					

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Activity 4.2. Characterize and engage with national stakeholders using stakeholder map, assessments, consultations, web site, conferences, and publications.	Sep-2018	Meetings, plans, conferences, web site	Continued engagement with national stakeholders	TAMUS, IWMI, ILRI, IFPRI	USA, ET, TA, GH
Activity 4.2.4. Stakeholder consultation: validate demand for candidate interventions; input on alignment with national plans and programs, opportunities and constraints.	Jan-2014	Workshop reports; Minutes of stakeholder meetings	Agreement on identified candidate interventions and pilotings	IWMI (Ethiopia, Ghana); ILRI (Tanzania)	USA, ET

3. Actions Performed

TAMUS has responsibility for Component 0, but works closely with the other partners, who have primary responsibilities in the areas of data acquisition needed to implement the Integrated Decision Support System (IDSS) and develop agreements with collaborating national organizations. This component is designed to plan and coordinate activities among the five partner institutions: TAMUS, IWMI, IFPRI, ILRI, and NCAT, as well as contacts and coordination with national collaborating institutions. Activities convened initially with a planning meeting of partner organizations in Addis Ababa in September, 2013, and will continue through Year 1.

The project's Year 1 Work plan and Performance Management Plan (PMP) were submitted 60 days after award (October 7, 2013). The first annual FTF indicator report was part of PMP. The work plan and FTF indicator report were developed by TAMUS with input from IWMI, IFPRI, ILRI, and NCAT. Revisions of these documents reflecting guidance from USAID were submitted to USAID on October 12, 2013. The plans were approved by USAID November 6, 2013.

In January 2014 a second meeting of project partners and USAID was held in Addis Ababa to develop further plans for the project. This meeting was preceded by an Ethiopian Stakeholder's conference on January 20, 2013 to solicit input on options for innovations and locations for future research. The meetings included the Program Management Committee, a two-day plenary session with FTF-ILSSI scientists and others, and a series of smaller meetings of scientists to discuss and develop methods for linking input data to analysis using the IDSS. Dates for the annual meeting and a major training session were set for June, 2014. Terms of reference for the committee, candidate members, and an operating budget were discussed at the January 2014 meeting, developed and submitted to USAID for comment and budget approval.

Plans are being made for the co-leaders and partner representatives to travel to Tanzania and Ghana in April 2014 to establish collaborators and make plans for engagement with counterpart FtF and other. Meetings of scientists from all partner institutions were held in January 2014 to discuss data sources and availability, to plan a "learning" case study to exercise the relationship between partners and deal with issues arising from this experience to inform the further use of the IDSS among partners in accordance with the established plan. Skype conference calls and other exchanges are expected in the ensuing several weeks. A front page for the website was prepared and circulated prior to the January 2014 meeting. Feedback was sought and obtained from USAID. The general approach for the website is agreed and details are being developed. The site is on line at <http://ilssi.tamu.edu/>.

Quarterly reports were requested in addition to the reports required by USAID. These reports were received on or before February 7, 2014 and cover activities up to the time of the January 2014 meeting and the forecasted actions by partners resulting from this meeting. Reference is made to the legacy document Results and Actions Following the January 2014 meeting for details.

IWMI collaborated with ILRI to conduct a desk study to develop a discussion paper proposing promising pilot interventions for Ethiopia. The desk study included research results from the Ag Water Solutions project and the

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Nile Basin Development Challenge, and highlighted the most promising candidate interventions. In addition to contribution to the capacity development plans for training on IDSS, IWMI advertised for a post-doctoral fellow for the FTF-ILSSI project to be based in Addis Ababa, Ethiopia.

Review and revise stakeholder maps and develop stakeholder engagement plan

IWMI reviewed stakeholder participation lists from the Ag Water Solutions project, which had an extensive national dialogue and engagement component. The stakeholder list for Ethiopia was updated and key stakeholders identified to participate in the Stakeholder Consultation workshop. A stakeholder engagement plan was developed for the stage of identifying promising interventions for piloting. A process for stakeholder consultation was also developed for the initial stakeholder consultation workshops.

Stakeholder consultation

IWMI and ILRI convened a Stakeholder Consultation on 20 January 2014 at ILRI in Addis Ababa. IWMI engaged a facilitator for the workshop to ensure full participation of stakeholders and documentation of the process. The purpose of the Stakeholder Consultation was to validate demand for candidate interventions and gather input and feedback to ensure alignment with national plans and programs. Technical presentations focused on integration of fodder into smallholder irrigation and water management and delivery. Facilitated discussions followed with predefined discussion points. The consultation yielded some useful insights and also represented the first step in building a community of practice around the issue of small-scale irrigation that will benefit the ongoing development of the project. The process and feedback were captured in a documentation report, and then summarized into a two-page consultation brief to share with stakeholders. Stakeholders prioritized the following interventions:

- Integrating fodder into small scale irrigation using technologies such as bund planting, intercropping, ally cropping and community and private nursery development
- In-situ rainwater harvesting, ground and surface water recharging, and soil fertility management technologies (including deep tillage to break up the hard pan)
- Piloting of a combination of water lifting irrigation technologies with various water sources.
- Development of mechanisms for watershed development

Literature review and experts consultation to identify candidate interventions

ILRI experts conducted a review of feed-related constraints to livestock production and potential for integration of fodder into smallholder irrigation both from global and local perspectives. An expert consultation was also conducted to gain a better understanding of the key issues. As practical experiences of fodder irrigation in Ethiopia are very limited, information gathered from literature and expert consultations were triangulated through a simple online consultation. The online consultation involved about 30 targeted respondents who have a background in irrigation, livestock and feed resources at local and international level. The survey posed a few focused questions probing their experiences on irrigated fodder in Ethiopia, factors that contributed to success/failure of integrating fodder to small scale irrigation, technologies that were most commonly applied and how successful they were in contributing to farm livelihoods.

The resulting report highlights both the opportunities and challenges of integrating fodder into smallholder irrigation and proposes key technology options. This document was used as a discussion paper for a stakeholder consultation meeting.

Ground work to establish pilot irrigated fodder interventions in Africa RISING sites

Piloting and demonstration of selected fodder technologies is one of the planned activities in the project. To build on the existing experiences, ILRI began ground work in one of the Africa RISING sites (Lemo, Hadiya Zone) to explore existing experiences and also farmers' interest to be engaged in forage development activities. A team of

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experts from ILRI and the Ministry of Water, Irrigation and Energy travelled to the Lemo Africa RISING Site on 9-10 Jan 2014 to:

- Conduct a quick analysis of water recharging capacity of the shallow wells of the sample farms
- Discuss with farmers about their plans of irrigated crops and if they are willing to include fodder
- Assess if there are local better irrigation practices and fodder integration in the area to help experience sharing.

Accordingly data required to estimate the water recharging potential of shallow wells of seven farms in Jawe and Upper Gana were collected and further analysis is progressing. From the discussion held with seven farms it was learnt that farmers are planning mainly for high value crops for home consumption and markets. The team also explored if farmers want to include some fodder crops into the irrigation systems to be used for fattening of small ruminants targeting one or more of the Ethiopian holiday markets.

With the guidance from Lemo Africa RISING site coordinator the team further explored irrigation experiences with farmers in Kambata, a neighboring Zone to Hadiya. They noted that irrigation practices are more intensive here and farmers use rope and washer pumps to irrigate up to half a hectare of crop fields. When farmers were asked about including irrigated fodder in their fields, they replied positively. Based on this field experience the team proposed seven farmers from Lemo (Jawe and Upper Gana) and potentially six farmers from Hangacha (Kambata) to participate in the irrigated fodder piloting.

Although the interest of farmers was encouraging it needs further examination in terms of access to market and site specific technologies and access to productive animals to fully endorse these sites and farms as sites for piloting and demonstration.

Preliminary Evaluations with IDSS

The NCA&T team discussed involvement and determined Joshua Idassi has several contacts in Tanzania and Ghana that would contribute to finding appropriate contacts in those countries. Because iDE is present in Ethiopia (re: vegetable production in small households) the team recommends connecting with the iDE director. NCA&T will assist IWMI, ILRI and IFPRI in choosing sites and partners for vegetable rainwater harvesting irrigation systems interventions. NCA&T has related work in Cambodia and most likely in Central America. In both those experiments iDE hardware is being utilized.

Preparations for evaluation of performance (i.e. uniformity coefficient, optimum hydraulic head, rate of emitter discharges, and etc.) of hardware marketed for small-scale irrigation was initiated. Previous research has evaluated the performance of a drip irrigation system marketed by iDE. An accessory that enables use of this drip system in steep slopes which can be applied in this project was also evaluated.

TAMAR teams discussed APEX/SWAT/FarmSim modeling programs as possible interventions based on past experience and knowledge of related research in Ethiopia at Bahir Dar University. The team participated in preliminary discussions about possible sites for subsequent application of the IDSS in Ethiopia including representatives from Toro Irrigation who are interested in developing and bringing drip irrigation system to small landholders in developing countries. SWAT, EPIC/APEX, and FARMSIM were used to assess the biophysical and economic sustainability of alternative farming systems utilizing small-scale irrigation in the South Gondar, North Gondar, and Southwest Shewa regions of Ethiopia.

Project leaders explored the best means and methods for collecting, transmitting and communicating data requirements to perform the biophysical simulation with APEX and SWAT. Possible linkages with ILRI's Africa RISING and LIVES were also discussed as some of their activities complement our tasks with Feed the Future

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Innovation Lab for Small Scale Irrigation. To become familiar with Ethiopian agriculture and use of small-scale irrigation for high-value crops, the team partook on a ten hour field trip.

Graduate Education Program

4. Results and conclusions against goals and objectives

a. Contribution to the expected outcome

The actions taken in Quarter 1 have established the foundation for the piloting of potential SSI solutions and identifying national partners. A review of previous research evidence contributed to ensuring that lessons learned are incorporated into pilot design and adequate data exists for modelling candidate interventions. A critical action to ensuring the selection of the interventions is demand-driven and relevant to national goals and interests was consultation with expert stakeholders at national level. Therefore, the actions taken in Quarter 1 contributed to the appropriate selection and location of candidate interventions for piloting.

Key technologies that can fit to the Ethiopian condition have been identified and extensive discussions were held with stakeholders to substantiate these findings. The proposed technologies include planting fodder on allocated plots, fodder integration through intercropping and alley cropping, establishment of community and private nurseries dedicated to fodder. A cross cutting intervention that emerged during discussion was also capacity building and awareness creation of farmers in terms of livestock and fodder production as a business model. Although further refinement of technologies in terms of their context is needed, it is clear that these technologies will be the basis for the next piloting and demonstration. Many of the fodder species proposed from the review work and substantiated by the stakeholders are high biomass yielding, have high nutritive value and are nitrogen fixers. When demonstrated and up scaled they show promise to contribute to increased food production, improved nutrition, protect the environment and accelerate economic development.

In addition to the review and ratification of the proposed technologies the stakeholder consultation ensured that these activities, their objectives and the overall goals of the program are in line with the Ethiopian government policies and thus such early engagement facilitates the overall process of implementation and also creates the sense of ownership by the stakeholders.

Preliminary results of evaluations were positive. TAMAR received a commitment from a Master of Science TAMU graduate student working in Temple to pursue a Ph.D. at NCA&T starting spring 2015 (Kori Higgs). While attending TAMU, this graduate began taking SWAT-related courses and she is being informed about this project. TAMAR team has been informed of this progress.

b. Any issues or problems arising

While the sub-agreement was not signed by both parties until January 2014, IWMI began work on the project in November to meet the expected timeframe as set out in the Gantt chart. The development of the discussion paper and the stakeholder engagement remained on target. However, it became clear that certain activities would be slightly delayed pending the cooperative partner meeting in January 2014, particularly the technical meetings. At those meetings, a clearer understanding was reached on methods and interventions. That has provided the basis to move forward on IWMI's input into modelling and also selection of intervention sites.

5. Next steps (including from January 2014 meetings)

1. Finalize plans for pilot interventions in Ethiopia:
 - a. Circulate Ethiopian stakeholder report and discussion paper for further input
 - b. Revise stakeholder report based on feedback
 - c. Finalize sites, considering FtF, AR, NBDC, LIVES

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- d. Finalize report on interventions to share during annual meeting
2. Undertake desktop studies in Tanzania and Ghana to draft discussion papers on promising candidate interventions
3. Convene Stakeholder Consultation Workshops in Tanzania and Ghana on candidate interventions.
4. Develop targeting framework for assessing likelihood of success of intensive irrigated forage production in specific locations: availability of land, labor, irrigation source, market for livestock products, etc.
5. Use targeting framework to select pilot sites for preliminary assessment of intervention options from long list of LIVES and Africa RISING sites.
6. NCA&T (Joshua Idassi) participate with CG centers in the choosing of possible sites in Tanzania and Ghana capitalizing on his previous research in those countries and also Tanzania being his birth place.
7. NCA&T will further discuss with IWMI team and other partners about conducting small scale irrigation vegetable irrigation interventions for small holder household income and nutrition.
8. Define APEX and SWAT model data needs and begin the process of bringing these data together to expand preliminary work.
9. Set up and conduct an additional pilot study/scenario with APEX and SWAT exploring irrigated agricultural production for an Ethiopian Kebele to be determined to further gain experience with agricultural systems in Ethiopia and to as a part of model training to be conducted in June, 2014. Development of the pilot model will also inform those decisions being made by the IWMI team and other partners concerning the selection of sites and irrigation interventions that will ultimately be examined.
10. Continue our contacts with Dr. Baker and others to examine existing FtF and Africa RISING sites as potential modeling sites for APEX, SWAT, and FARMSIM.
11. Connect graduate students to entire modeling team.
12. Planning was initiated to conduct trial simulations for the Fogera Woreda using data collected as part of the Nile Basin Challenge. Results will be used to develop training materials for SWAT, APEX, and FARMSIM training in June.

Consideration for news items arising from progress

The Stakeholder Consultation workshop held in Addis Ababa on 20 January 2014 was a milestone toward establishing pilot interventions and field locations. The workshop brought together key stakeholders and potential project partners who provided input into design of interventions. A brief overview of progress and accomplishments on the FtF-ILSSI cooperative agreement is in preparation and will be made available to USAID as a potential news article.